

What Is Claimed Is:

1. An extruder mixer for plastified material comprising a rotatable elongated screw and means for rotating said screw, said screw having a mixing section adapted to mix plastified materials, said mixing section having an inlet channel connected to a cross-axial pump constructed and arranged to feed a subsequent said channel, wherein said subsequent channel is connected to further feed said mixture to at least one subsequent cross-axial pump that is bounded by a flight on at least one side of said output channel to deliver the resulting plastic mixture.

2. The apparatus of Claim 1, wherein the cross-axial pumps are bounded by channels on more than one side.

3. The apparatus of Claim 1, wherein an upstream feeder is connected to cause and to control input feed of mixable materials.

4. The apparatus of Claim 1, where a screw channel is provided at the input of said mixer to control the flow rate mixer input.

5. The apparatus of Claim 1, where an output flight is connected to a downstream flight of said mixer section.

6. The apparatus of Claim 1, where an output flight is connected to a channel of said extruder mixing section.

7. The apparatus of Claim 1, wherein the dimensions of said first and subsequent

channels are substantially the same as each other.

8. The apparatus of Claim 1, wherein said extruder screw is substantially vertically oriented.

9. The apparatus of Claim 1, wherein the dimensions of said first and subsequent channels are different from each other.

10. The apparatus of Claim 1, wherein the dimensions of said first and subsequent cross-axial pumps are the same.

11. The apparatus of Claim 1, wherein the dimensions of said first and subsequent cross-axial pumps are different from each other.

12. The apparatus of Claim 1, wherein said channels are oriented substantially parallel to the screw axis.

13. The apparatus of Claim 1, wherein said channels are oriented at an angle to the screw axis.

14. The apparatus of Claim 1, wherein at least some of the channels are unconnected to said inlet channel and are bounded by a flight on one side.

15. The apparatus of Claim 14, wherein at least some of said non-inlet channels are bounded by a flight on two sides.

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16. The apparatus of Claim 1, wherein said mixer is not starve fed.

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17. The apparatus of Claim 1, where resistance devices are provided on said screw to force said plastic material into said outlet channels.

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18. The apparatus of Claim 1, wherein there are multiple inlet channels.

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19. The apparatus of Claim 1, wherein there are multiple connected inlet flights.

20. The apparatus of Claim 1, wherein there are multiple connected outlet flights.

21. In a method of mixing plastic or plastifiable materials in an extruder comprising a rotatable extruder screw having a mixing section comprising a plurality of inlet and outlet channels for said materials, the steps which comprise:

- (a) drawing said materials into an inlet channel,
- (b) cross-axially pumping said material from said inlet channel to at least one subsequent said inlet channel, and
- (c) cross-axially pumping said material.

22. The method of Claim 21, comprising the further step of cross-axially pumping said material into an outlet channel.

23. The method of Claim 21 comprising the further step of controlling upstream feed of input of said material to said extruder.

24. The method of Claim 23, wherein said input is fed through a screw channel, and wherein said step of controlling comprises constraining the feed rate of said screw channel.

25. The method of Claim 21 comprising the further step of controlling the rate of material output from said outlet channel.

26. The method of Claim 23, wherein an output flight is connected to a channel of said extruder, and wherein said step of controlling comprises limiting the rate of rotation of said output flight.

27. The method of Claim 21, comprising the step of starve feeding said extruder.

28. The method of Claim 21 comprising the step of applying resistance to output material flow to force said plastic material into said outlet channel.

29. The method of Claim 21 comprising the step of introducing said plastifiable material separately into a plurality of separate inlet channels.

30. The method of Claim 21 comprising the step of concurrently feeding said plastifiable material into a multiplicity of individual channels.

31. The method of Claim 21 including the further step of connecting a plurality of said channels together for concurrent flow of said material therein.

32. The method of Claim 21 comprising the step of removing said mixed material

33. The method of Claim 21 comprising the further step of maintaining said plastifiable material in a melted state within said mixing section.

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